

LOAN DOCUMENT

	PHOTOGRAPH THIS SHEET											
DTIC ACCESSION NUMBER	LEVEL	INVENTORY	0									
	<p><u>DOC 83-01</u></p> <p>DOCUMENT IDENTIFICATION</p> <p><u>1983</u></p>											
	<p>DISTRIBUTION STATEMENT A</p> <p>Approved for Public Release</p> <p>Distribution Unlimited</p>											
DISTRIBUTION STATEMENT												
<p>ACCESSION FOR</p> <table border="1" style="width: 100%;"> <tr> <td>NTIS</td> <td>GRAM</td> <td rowspan="4" style="text-align: center; vertical-align: middle;"> <input checked="" type="checkbox"/> </td> </tr> <tr> <td>DTIC</td> <td>TRAC</td> </tr> <tr> <td>UNANNOUNCED</td> <td></td> </tr> <tr> <td>JUSTIFICATION</td> <td></td> </tr> </table>		NTIS	GRAM	<input checked="" type="checkbox"/>	DTIC	TRAC	UNANNOUNCED		JUSTIFICATION			
NTIS	GRAM	<input checked="" type="checkbox"/>										
DTIC	TRAC											
UNANNOUNCED												
JUSTIFICATION												
BY												
DISTRIBUTION/												
AVAILABILITY CODES												
DISTRIBUTION	AVAILABILITY AND/OR SPECIAL											
<p>A-1</p> <p>DISTRIBUTION STAMP</p>		DATE RECEIVED IN DTIC										
<p>Reproduced From</p> <p>Best Available Copy</p>		DATE RETURNED										
<p>20000203 100</p>		REGISTERED OR CERTIFIED NUMBER										
PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC												

HANDLE WITH CARE

FOR FURTHER INFORMATION CONCERNING DISTRIBUTION CALL (703) 767-8040

PLEASE CHECK THE APPROPRIATE BLOCK BELOW:

AOR _____

☐ _____ copies are being forwarded. Indicate whether Statement A, B, C, D, E, F, or X applies.☒ DISTRIBUTION STATEMENT A:
APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED☐ DISTRIBUTION STATEMENT B:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES
ONLY; (Indicate Reason and Date). OTHER REQUESTS FOR THIS
DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).☐ DISTRIBUTION STATEMENT C:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND
THEIR CONTRACTORS; (Indicate Reason and Date). OTHER REQUESTS
FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).☐ DISTRIBUTION STATEMENT D:
DISTRIBUTION AUTHORIZED TO DoD AND U.S. DoD CONTRACTORS
ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO
(Indicate Controlling DoD Office).☐ DISTRIBUTION STATEMENT E:
DISTRIBUTION AUTHORIZED TO DoD COMPONENTS ONLY; (Indicate
Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).☐ DISTRIBUTION STATEMENT F:
FURTHER DISSEMINATION ONLY AS DIRECTED BY (Indicate Controlling DoD Office and Date) or HIGHER
DoD AUTHORITY.☐ DISTRIBUTION STATEMENT X:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES
AND PRIVATE INDIVIDUALS OR ENTERPRISES ELIGIBLE TO OBTAIN EXPORT-CONTROLLED
TECHNICAL DATA IN ACCORDANCE WITH DoD DIRECTIVE 5230.25, WITHHOLDING OF
UNCLASSIFIED TECHNICAL DATA FROM PUBLIC DISCLOSURE, 6 Nov 1984 (indicate date of determination).
CONTROLLING DoD OFFICE IS (Indicate Controlling DoD Office).☐ This document was previously forwarded to DTIC on _____ (date) and the
AD number is _____☐ In accordance with provisions of DoD instructions, the document requested is not supplied because:☐ It will be published at a later date. (Enter approximate date, if known).☐ Other. (Give Reason)DoD Directive 5230.24, "Distribution Statements on Technical Documents," 18 Mar 87, contains seven distribution statements, as
described briefly above. Technical Documents must be assigned distribution statements.Cynthia Gleisberg
Authorized SignatureCynthia Gleisberg
Print or Type Name
334-8255-2924
Telephone Number

High-Risk Aviator Study

Darwin S. Ricketson, Jr.
US Army Safety Center

Michael G. Sanders
Army Research Institute

1983

1. Objective - Determine if high-risk aviators can be identified based on their past accident experience.
2. Past Research
 - a. A literature review identified more than 100 studies from 1919 to 1981 related to "accident proneness".
 - b. Fifteen of these studies were selected for detailed review.
 - c. The major finding was that if accident proneness exists, it is very complex and there seems to be no clear cut way to identify such individuals.
 - d. Air Force Safety Center personnel reported that they had conducted no studies on accident proneness.
 - e. Naval Safety Center personnel reported a study of dual-accident aviators but indicated the results would not support administrative actions regarding these aviators.
3. Analysis of Army accident data

a. Analysis sought to determine whether aviators with two or more class A, B or C accidents in which they were identified as a definite primary or secondary role should be considered high risk aviators.

b. Data were not available to avoid violating fundamental assumptions required for a valid analysis: each aviator was not in Army aviation for the entire period under study, did not have the same amount of flying time (quantity of exposure) or the same hazardness of flying time (quality of exposure).

c. Analysis findings:

(1) Chart 1 shows the distribution of aviators actually having a definite role in accidents over almost ten years. The actual distribution is compared to the distribution of aviators that would be expected by chance. This chance distribution was generated using the Poisson distribution which takes the number of aviators and the number of accidents actually experienced and provides an estimate of the number of aviators who would experience 0, 1, 2, 3 and 4 accidents by chance alone. It can be seen of the aviators actually experiencing one accident, only 112 went on to have another accident. This is less than the 142 that would be expected by chance and provides no support for the contention that these aviators had a second accident

because they were accident prone.

(2) Beginning in FY 76, Army aircraft accidents were investigated to determine not only what errors aviators made but the causes of the errors in terms of inadequate training, experience, supervision, maintenance, equipment design, written procedure and self-discipline. Since that time almost half of the error causes reported by accident boards have been inadequate self-discipline, i.e., inadequate composure, attention, overconfidence, attitude and motivation. Chart 2 shows the distribution of aviators whose accident-causing errors were due only to inadequate self-discipline. It can be seen that only 4% of these aviators had another accident due to inadequate self-discipline. However, this is more than the 1% expected by chance and means that aviators having one accident due only to inadequate self-discipline have a greater propensity for a second such accident than would be expected by chance alone.

(3) Last, an evaluation was made of the time between aviator's accidents to see if the relationship between multiple accidents was time dependent. The results of this evaluation are shown in Chart 3. It can be seen that the median time between accidents one and two did not differ more than four months for aviators having two, three

or four accidents. This difference is not considered a practical or reliable difference considering the wide range in months between accidents. For aviators having three and four accidents the median time between their second and third accident was only one month. This also is not considered a practical or reliable difference. The median time between accidents three and four for aviators having four accidents was seven months. Again, the range is so large that this figure is considered neither reliable nor useful in any way.

4. Conclusions

a. There is no practical or valid way of identifying a high-risk/accident-prone Army aviator based only on the number of accidents experienced.

b. Aviators who knowingly make errors of their own volition (inadequate self-discipline) that place the crew and aircraft at unnecessary risk should be considered by a flight status review board for administrative removal from aviation service. This action should be taken whenever such errors are detected regardless of whether the error resulted in an accident or not.

3. Recommendations

a. Define high-risk aviation personnel as:

(1) Personnel who operate aviation equipment or who

manage/supervise aviation personnel and equipment; and

(2) Knowingly make errors of their own volition (inadequate self-discipline) that place aviation personnel or equipment at unnecessary risk.

b. Establish a central repository to receive and maintain information from Flight Evaluation Boards (FEB) and Accident Collateral Boards (ACB) regarding high-risk personnel.

c. Establish a Flight Status Review Board (FSRB) to consider high-risk aviator cases for administrative removal from flight status. Cases would be forwarded to the FSRB from the central repository on the basis of a single flagrant violation or a series of lesser violations over time.

d. Require a FEB whenever a commander becomes aware of an instance meeting the high-risk definition. If the FEB finds that the instance meets the high-risk definition, require the FEB report be forwarded to the central repository.

e. Require that ACB's determine whether any accident-causing error discovered by the ACB meets the high-risk definition. Require the ACB report be forwarded to the central repository whenever a high-risk error is determined.

f. Maintain the independence of accident investigations and reports from actions involving FEB's ACB's and the FSRB.

CHART 1

Aviators Having a Definite Role in Accidents (A, B, or C)

From 1 Jan 73 - 1 Nov 82

<u>Number Accidents</u>	<u>Aviators Having Accidents</u>	
	<u>Actual</u>	<u>Chance</u>
1 or more	2302 (100%)	2260 (100%)
2 or more	249 (11%)	310 (14%)
3 or more	42 (2%)	29 (1%)
4	7 (.003%)	2 (.001%)

CHART 2

Aviators Committing Errors Due to Inadequate Self-Discipline

From FY 76 - 82

<u>Accidents</u>	<u>Aviators Having Accidents</u>	
	<u>Actual</u>	<u>Chance</u>
1 or more	154 (100%)	159 (100%)
2	6 (4%)	1 (1%)

CHART 3

Time Between Accidents for Aviators With More Than One
Definite Role Accident (1 Jan 73 - 1 Nov 82)

Accidents Per Aviator	1&2	Accidents 2&3	3&4	Number of Aviators
2	17* (1-107)**			207
3	14 (1-87)	11 (1-80)		35
4	13 (6-50)	12 (8-23)	7 (1-59)	7

*Median in months

**Range in months